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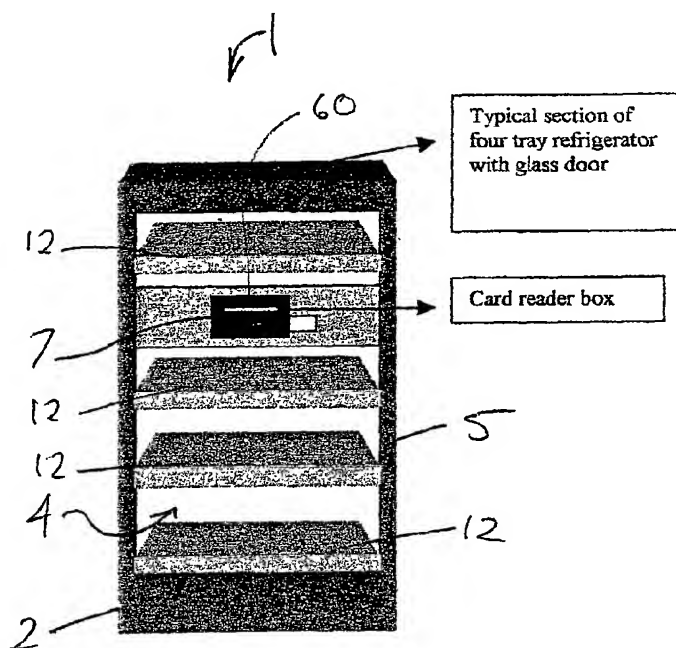
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(54) Title: A DISPENSING DEVICE



(57) Abstract: A dispensing device in the form of a minibar (1) includes a prismatic insulated housing (2) for containing one or more goods (3) that are available to be dispensed. Housing (2) includes an opening (4) through which goods (3) are dispensed from the housing. A door (5) is moveable between an open and a closed configuration for respectively allowing and preventing the dispensing of goods (3) through opening (4). Minibar (1) also includes an electromechanical door locking device (6) that progresses between a locked and an unlocked configuration for respectively retaining door (5) in the closed configuration and allowing the door to be moved to the open configuration. A smart card terminal (7) interacts with a smart card (8) that is associated with a person desiring to access the goods that are within housing (2). Card (8) includes identification data associated with the person and terminal (7) is responsive to the data for controlling device (6) and allowing selective dispensing of the goods. An inventory counter, in the form of an electronic controller (9), determines the quantum and type of goods dispensed and adds inventory data to card (8) that is indicative of that quantum and type of goods.

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TITLE: A DISPENSING DEVICE

FIELD OF THE INVENTION

The present invention relates to a dispensing device and an inventory control system using that device.

5 The invention has been developed primarily as a dispensing device for use with refrigerators in hotel rooms and will be described hereinafter with reference to that application. It will be appreciated, however, that the invention is not limited to that particular field of use and is also suitable for other dispensing devices and for use in other areas, whether those areas be private or common.

10 **BACKGROUND TO THE INVENTION**

A major difficulty faced by hotel operators is that the minibar services that are provided are usually run at a loss or minimal margin. This arises from a variety of factors including:

1. A perception by part of the customer base that this is a complementary service;
- 15 2. The need to rely, to a great extent, upon customer honesty and recollection and, following from this, the ease at which customers will "forget" the quantity of goods that they have consumed from the minibar;
3. The relatively high price that is charged for the items;
4. A reluctance on the part of the operator to argue with customers about the
- 20 extent of the consumption of goods from the minibar when that is usually a small proportion of the total cost of the stay;
5. Some losses or "slippage" due to staff dishonesty or inadvertence.

There are also other disadvantages that arise, including the stocking practices for these minibars. That is, the minibars are usually stocked with a wide variety of goods,

25 although only a small quantity of each. If a particular guest has a desire for more of a particular good, they may not be prepared to order it and then wait for its arrival.

There are also certain demographic and cultural groups of customers that result in greater losses from minibar operations.

The stocking of the minibars is a time consuming process and requires the daily

30 movement of persons and inventory between many locations in hotel. While there will be a central store for the minibar goods, there is usually many other locations through

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out the establishment where the goods are stored prior to eventually being placed in the minibars. This provides significant temptation to unscrupulous staff to pilfer the goods.

Any discussion of the prior art throughout the specification should in no way be considered as an admission that such prior art is widely known or forms part of
5 common general knowledge in the field.

SUMMARY OF THE INVENTION

It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

According to a first aspect of the invention there is provided a dispensing
10 device including:

a housing for containing one or more goods that are available to be dispensed;
an opening in the housing through which the goods are dispensed from the housing;

a door that is moveable between an open and a closed configuration for
15 respectively allowing and preventing the dispensing of the goods;

a door locking device that progresses between a locked and an unlocked configuration for respectively retaining the door in the closed configuration and allowing the door to be moved to the open configuration;

a card terminal for interacting with a card associated with a person desiring to
20 access the goods within the housing, the card including identification data associated with the person and the terminal being responsive to the data for controlling the locking device and allowing selective dispensing of the goods; and

an inventory counter for determining the quantum and type of goods dispensed and for adding inventory data to the card indicative of that quantum and type of goods
25 dispensed.

Preferably, the dispensing device includes a card locking device that progresses between a locked and an unlocked configuration for respectively preventing and allowing relative movement between the card and the terminal. More preferably, the dispensing device includes a lock controller that is responsive to the identification data
30 for selectively allowing operation of the locking devices and the dispensing of the goods to the person. Even more preferably, the controller prevents actuation of the card locking device unless the door locking device is in the locked configuration. That is, the

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preferred operation is for the door to remain locked until the card is inserted into the terminal; the card is then locked in the terminal and the door unlocked and allowed to be opened; once the door closes and locks, the card is then unlocked from the terminal.

According to a second aspect of the invention there is provided a dispensing
5 device including:

a housing for containing one or more goods that are available to be dispensed;

an opening in the housing through which the goods are dispensed from the
housing;

a door for moving between an open and a closed configuration for respectively
10 allowing and preventing the dispensing of the goods through the opening;

a door locking device that progresses between a locked and an unlocked
configuration for respectively retaining the door in the closed configuration and
allowing the door to be moved to the open configuration;

a card terminal for interacting with a card associated with a person desiring to
15 access the goods within the housing, the card including identification data associated
with the person;

a card locking device that progresses between a locked and an unlocked
configuration for respectively preventing and allowing relative movement between the
card and the terminal; and

20 a lock controller being responsive to the data for selectively allowing operation
of the locking devices and the dispensing of the goods to the person, the controller
also preventing actuation of the card locking device unless the door locking device is
in the locked configuration.

Preferably, the dispensing device includes an inventory counter for
25 determining the quantum and type of goods dispensed and for adding inventory data to
the card that is indicative of that quantum and type of goods dispensed.

According to a third aspect of the invention there is provided an inventory
recording system including:

a validation terminal for issuing a card to a person, wherein the card contains
30 identification data for the person;

a plurality of dispensing devices containing goods that are available to be
dispensed, the devices each having a card terminal for interacting with the card for

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allowing selective dispensing of the goods to the person wherein, upon that dispensing occurring, the card terminal adds inventory data to the card that is indicative of the quantum and type of goods dispensed; and

- a control terminal for interacting with the card to access the inventory
- 5 information for providing a record of the goods that were dispensed.

According to a fourth aspect of the invention there is provided an inventory control system including:

- a validation terminal for issuing a card to a person, wherein the card contains identification data for the person;
- 10 a store terminal that adds store data to the card that is indicative of the type and quantity of goods that have been allocated to the person;
- a plurality of dispensing devices for containing goods that are available to be dispensed, the devices each having a card terminal for interacting with the card for allowing selective access to the dispensing device wherein, once that access has
- 15 occurred, the card terminal adds inventory data to the card that is indicative of the quantum and type of goods dispensed and the quantum and type of goods added to the dispensing device; and
- a control terminal for interacting with the card to access the inventory information for providing a record of the goods that were dispensed and the goods that
- 20 were added.

Preferably, the validation terminal validates the card for use with only selected ones of the plurality of dispensing devices.

According to a fifth aspect of the invention there is provided a dispensing device including:

- 25 a housing for containing one or more goods that are available to be dispensed;
- an opening in the housing through which the goods are dispensed from the housing;
- a door that is moveable between an open and a closed configuration for respectively allowing and preventing the dispensing of the goods;
- 30 a shelf located within the housing for supporting the goods;
- a detector for determining the presence or absence of the goods on the shelf;

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a card terminal for interacting with a card associated with a person desiring to access the goods within the housing, the card including identification data associated with the person and the terminal being responsive to the detector for adding inventory data to the card indicative of that quantum and type of goods dispensed.

5 Preferably, the dispensing device includes a door locking device that progresses between a locked and an unlocked configuration for respectively retaining the door in the closed configuration and allowing the door to be moved to the open configuration. More preferably, the terminal is responsive to the identification information for selectively actuating the locking device to progress between the locked and the unlocked
10 configurations.

 Preferably also, the dispensing device includes a card locking device that progresses between a locked and an unlocked configuration for respectively preventing and allowing relative movement between the card and the terminal. More preferably, the dispensing device includes a lock controller that is responsive to the identification data
15 for selectively allowing operation of the locking devices and the dispensing of the goods to the person. Even more preferably, the controller prevents actuation of the card locking device unless the door locking device is in the locked configuration.

 In a preferred form, the shelf includes an array of formations for receiving complementarily shaped goods. More preferably, the detector includes a plurality of
20 switches that are located adjacent respective formations. Even more preferably, the formations include respective bases and the switches are located at or below the base, wherein the switches are triggered by the weight of the respective good.

 According to a sixth aspect of the invention there is provided a shelf for a dispensing device, the shelf including:

25 a platform for supporting goods;
 an array of locating formations in the platform for receiving the respective goods; and
 a plurality of detectors associated with the respective formations for providing signals indicative of the movement of the goods into or out of engagement with the
30 formations.

 Preferably, the shelf includes a controller that is responsive to the signals for providing inventory data that is indicative of the quantity and type of goods that are

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supported on the shelf. More preferably, the inventory data is also indicative of changes in the goods that are supported by the shelf.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention will now be described with reference
5 to the accompanying drawings in which:

Figure 1 is a perspective view of a dispensing device according to a first embodiment of the invention;

Figure 2 is an exploded view of a shelf of the device of Figure 1;

Figure 3 is a schematic sectional plan view of a shelf of the device of Figure 1;

10 Figure 4 is a schematic view of a smart card for use with the device of Figure 1;

Figure 5 is a flow chart that illustrates the operation of the device of Figure 1;

Figure 6 is a perspective view of a dispensing device according to a second embodiment of the invention;

Figure 7 is a front view of a door panel of the device of Figure 6;

15 Figure 8 is a right side view of the door of the device of Figure 6;

Figure 9 is a section along line 9-9 of Figure 7;

Figure 10 is a front view of a second door panel of the device of Figure 6;

Figure 11 is a front view of a third door panel of the device of Figure 6;

Figure 12 is a front view of a display unit of the device of Figure 6;

20 Figure 13 is a right side view of the display unit and smart card terminal of the device of Figure 6;

Figure 14 is a front view of a smart card of the device of Figure 6; and

Figure 15 is an enlarged front view of a lock mechanism of the device of Figure 6.

25 DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, and in particular to Figure 1 and Figure 2, according to a first embodiment of a dispensing device, a minibar 1 includes a prismatic insulated housing 2 for containing one or more goods 3 that are available to be dispensed.

Housing 2 includes an opening 4 through which goods 3 are dispensed from the housing.

30 A door 5 is moveable between an open and a closed configuration for respectively allowing and preventing the dispensing of goods 3 through opening 4. Minibar 1 also includes an electromechanical door locking device 6 that progresses between a locked

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and an unlocked configuration for respectively retaining door 5 in the closed configuration and allowing the door to be moved to the open configuration. A smart card terminal 7 interacts with a smart card 8 that is associated with a person desiring to access the goods that are within housing 2. Card 8 includes identification data

5 associated with the person and terminal 7 is responsive to the data for controlling device 6 and allowing selective dispensing of the goods. An inventory counter, in the form of an electronic controller 9, determines the quantum and type of goods dispensed and adds inventory data to card 8 that is indicative of that quantum and type of goods.

Minibar 1 also includes a card locking device (not shown) that progresses
10 between a locked and an unlocked configuration for respectively preventing and allowing relative movement between card 8 and terminal 7. Moreover, controller 9 prevents actuation of the card locking device unless the door locking device 6 is in the locked configuration.

Minibar 1 is installed in a hotel room and is stocked with goods that the guest or
15 guests staying in the room may wish to access. The minibar includes four spaced apart and removable shelves 12 for supporting the goods. As best shown in Figure 2, shelf 12 includes a cover 13 that has a 5 by 3 array of locating formations for receiving respective goods. The formations are slots 14 that are arranged in rows, where the shape of the slots in each row is the same, although the shape of the slot in different rows is not
20 necessarily the same. That is, the slots are configured for complementarily receiving different types of goods which rest upon a platform 15 that lies below cover 13. For example, one row is configured for receiving cans of soft drink, another row is configured for receiving cardboard packages containing fruit juice, and another row is configured for receiving bottles of beer. Other shelves include alternatively shaped and
25 arranged slots for receiving different goods such as:

1. chocolate bars;
2. packets of potato crisps;
3. wines;
4. sparkling wines;
- 30 5. water;
6. other beverages; and
7. other foodstuffs such as single serve noodles, packaged dried fruit or biscuits.

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In other embodiment goods other than beverages and foodstuffs are dispensed. For example, the goods could be toothpaste, soap or other toiletries or, alternatively, products such as souvenirs. That is, while the embodiment of the minibar includes a refrigerated housing 2, in other embodiments the temperature of the housing is not
5 regulated.

Preferably also, shelves 12 are height adjustable, in that their relative vertical spacing is adjustable. In alternative embodiments, shelves 12 are fixedly located within housing 2 for providing greater security against tampering by an unscrupulous guest or employee.

10 In some embodiments, shelves 12 are formed from a single piece of moulded plastics that has an upper surface that defines the formations.

Figure 3 illustrates a schematic sectional view through minibar 1. The section is taken through a shelf 12 other than that illustrated in Figure 2. That is, the shelf of Figure 3 includes a 4 by 3 array of slots 14. Underlying these slots is a plurality of
15 detectors in the form of microswitches 18 that are mounted to platform 15. These switches are arranged in groups of two or three below the respective slots and toggle between a raised and a lowered configuration. For the sake of convenience only some of the switches have been numbered, but it will be understood by the addressee that all the plain circles in the array represent such switches. The hatched circles represent a gap
20 between active switches.

When a good is received within a slot it rests upon platform 15 and depresses the respective switch or switches into the lowered configuration. When a good is removed from the respective slot the corresponding switch or switches toggles to the upper configuration.

25 All the switches 18 provide respective signals to controller 9 so that a determination can be made of the state of the switches and hence the presence or absence of a good in a particular slot. The signals are provided along wires (not shown) that extend along the base of platform 15. Preferably, the wires are concealed to prevent tampering by unscrupulous individuals or inadvertent entanglement with the goods on an
30 adjacent lower shelf.

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Switches 18 are covered with a flexible layer of plastics material (not shown) to protect them against any spillage that may occur. This also facilitates cleaning of the shelves.

5 The switches are calibrated for the product in question so that they remain sufficiently sensitive and robust during the repeated removal and placement of the goods. For goods that a particularly light weight, the relevant ones of switches 18 are provided with a cantilevered arrangement to ensure that the switches toggle correctly. Such goods include instant noodles and some confectionary.

10 Shelf 12, as illustrated in Figure 3, includes two or three microswitches 18 in each group. If any of the switches in a group indicates that it is in the lowered configuration it is taken that a good is present. It is only if all the switches in a group are in the raised configuration that it will be taken that a good is not present in the respective slot. This provides greater flexibility when the shelves are packed, as the positioning of the goods is no longer as critical. In other embodiments, however, each
15 slot is associated with one switch only.

Shelves 12 are slidably mounted within housing 2 and are removable. Accordingly, if a different selection of goods is required to be dispensed, the shelves are removed and replaced with shelves having differently arranged and/or shaped slots. Alternatively, cover 13 is removed and replaced with another cover. In the latter case
20 this can result in the grouping of the switches no longer correlating with the location of the slots. This, however, is resolved through programming of controller 9.

In alternative embodiments, the need for programming is avoided by permanently assigning each of the switches to one of a predetermined number of specifically located groups. This requires that all covers used in this alternative have
25 slots that only overlie one of the groups. It has been found that the limitations that this alternative places upon the design of the covers and the ability to fully stock the minibar are more than compensated by the labour savings in programming and re-stocking. This provides a robust system as the chances of programming errors and erroneous cover selection and placement are reduced.

30 In other embodiments use is made of switches that are placed at locations other than on platform 15. In one embodiment, the switches are mounted to one side of the slot and being biased into engagement with the goods. In other embodiments use is

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made of alternative detectors for determining the presence or otherwise of the goods in the housing. For example, the combination of a light source and detector is used in some embodiments, while in others use is made of two spaced apart contacts that have a small potential therebetween and which are configured for engagement with the conductive
5 packaging of the goods. The latter is only suitable for detecting the presence of metallic or other conductive objects.

Locking device 6 includes a housing 21 that is located within housing 2. Housing 21 encloses an electric stepper motor (not shown) that is actuated by controller 9. This motor has a drive shaft 22 that extends axially outwardly from
10 housing 2 and 21. The shaft terminates in a free end 23 that supports a radially extending locking lever 24. When actuated, the motor rotates shaft 22 such that lever 24 is moved through 180° between a locked and an unlocked configuration.

In other embodiments, device 6 is located on one of the walls of housing 2, while in further embodiments, it is located on one of the shelves. In the latter case, the shelf
15 concerned is fixedly mounted within housing 2. In still further embodiments a plurality of like spaced apart devices 6 are used to increase the security offered by minibar 1 to tampering.

In alternative embodiments, the locking device 6 takes the form of an electromagnetic device (not shown), in that use is made of a coil to generate a magnetic
20 field that prevents door 5 from being moved from the closed position. In this case, door 5 includes one or more permanent magnets that are mounted to an inner surface of the door.

Returning to the embodiment illustrated in the drawings, door 5 includes a locking formation (not shown) that is engaged with lever 24 when that lever is in the
25 locked configuration. This maintains the door in the closed configuration and prevents the person from accessing the goods within housing 2. Minibar 1 includes an audible alarm (not shown) that is triggered if controller 9 detects an unauthorised entry to the housing. This unauthorised entry is detected in this embodiment by a sensor (not shown) that detects the attempted forcing open of the door while lever 24 is in the locked
30 configuration.

As shown in Figure 4, card 8 is generally rectangular and includes four sides 31, 32, 33 and 34. Adjacent to side 32 is an active area 35 that contains an integrated

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circuit 36 and an array of electrical contacts 37 for allowing external electrical contact with circuit 36. Card 8 includes a locking formation in the form of a rectangular notch 38 that extends inwardly from edge 33. In other embodiments, notch 38 is shaped differently. Moreover, in still further embodiments the notch is in the form of an opening through the card. Use is also made, in other embodiments, of more than one locking formation.

Terminal 7 includes a card locking device that has an electromechanical actuator 41 and a bolt 42 of rectangular cross section that is movable axially between a retracted and an extended configuration. When card 8 is inserted into terminal 7, the contacts 37 are progressed into engagement with corresponding contacts (not shown) that are located within the terminal. This allows controller 9, via terminal 7, to interrogate the data stored on card 8. In response to a favourable interrogation, controller 9 actuates terminal 7 to progress bolt 42 from the retracted to the extended configuration. This has the effect of locking card 8 within the terminal. Controller 9 then, after a short delay, actuates the stepper motor to progress lever 24 to the unlocked configuration. Door 5 is then able to be opened and the goods accessed from within housing 2.

Once the desired goods have been removed the corresponding switch 18 is triggered and controller 9 signalled as to the removal of that good. Then, once door 5 is returned to the closed configuration, controller 9 automatically actuates the stepper motor to progress lever 24 to the locked configuration. The changes in status of the inventory within the minibar are assessed from the signal obtained from the switches and provided as inventory information to card 8. The inventory information includes details about the quantity and type of goods that were dispensed, the time that door 5 was opened, and a unique number for identifying minibar 1. The controller compiles and stores this information in circuit 36. Accordingly, card 8 carries a record of the goods the person has removed from the or each minibar that has been accessed.

Once controller 9 has completed the storage of the inventory information on card 8, it triggers actuator 41 to progress bolt 42 to the retracted configuration. This allows the person to then remove card 8 from terminal 7.

In other embodiments use is also made of a keypad on minibar 1 that is linked with controller 9. That is, in addition to inserting card 8 into terminal 7, the person must also provide a designated PIN to the controller via the keypad.

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Alternative embodiments of terminal 7 make use of alternative means for retaining card 8 within the terminal during the dispensing operation. For example, in one such embodiment, the terminal includes two opposed clamping faces that are actuated to move in and out of clamping engagement with card 8 upon being

5 respectively actuated by controller 9 to do so.

Minibar 1 also includes a two line LCD alpha numeric display 60. This display is actuated by controller 9 to provide visual instructions and information to the person wishing to access the goods. In other embodiments other types of displays are used.

Preferably, card 8 also functions to unlock the door to the hotel room in which
10 minibar 1 is located.

Card 8 also includes passive areas 43 and 44 for bearing indicia such a printed logos or other information. For example, in this embodiment area 43 bears printing that indicated the name and address of the hotel, while area 44 bears printed advertising for other services offered by the hotel or their affiliates. In other
15 embodiments, area 44 is covered with a removable label that includes advertising from another party, where that party is providing consideration, whether that be financial or in kind, for the presence of the label on the card.

Reference is now made to Figure 5 where corresponding features are denoted by corresponding reference numerals. The second embodiment of the invention is
20 located within a hotel that includes:

1. A plurality of rooms, each of which have a minibar as described above;
2. A plurality of common areas, each of which have a dispensing device that is considerably larger than the minibars but which function in the same way;
3. A reception area where the guests check in and out;
- 25 4. A storage area where goods intended for stocking the minibars is kept; and
5. A number of room service staff who are each tasked with the daily process of ensuring the minibars with their respective areas are stocked with the appropriate number of goods.

As the guests arrive they proceed to the reception area where they check in to
30 the hotel. As part of the check in process a blank smart card 8 is inserted into a validation and reader terminal 51 where the card is uploaded with identification information about the guest. If the card was not initially blank then terminal 51 first

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erases any data that is resident in the memory of the card. The identification information includes not only a unique code for that guest, but also access data that allows the guest to open selected ones of the minibars and dispensing devices. This function is particularly pertinent for limiting access to minors to only those minibars and dispensing devices containing non-alcoholic products. In this embodiment all the minibars and dispensing devices are accessible by the guest. However, in other embodiments that access is limited to the minibar in the room that is allocated to the guest and the dispensing devices that are disposed in the common areas. As will be appreciated from the teaching herein, other access combinations are possible. For example, the guest may be in a room that does not have a minibar, and the access is to the dispensing devices only. In other embodiments, the guest is not allowed access to any of the minibars or dispensing devices unless they are prepared to leave a financial deposit or credit card imprint with the receptionist.

Once card 8 is issued the guest can access the relevant devices to obtain the desired goods, as described above. That is, after each transaction card 8 is updated to include details of the goods dispensed to the guest. In some cases the number of transactions is limited and the guest has to report back to the reception area to arrange for an adjustment of that limit. For example, some embodiments will invalidate card 8 after a predetermined number or value of goods have been dispensed to the guest, regardless of whether these goods were dispensed from the minibar in the room allocated to the guest or by the hallway and other common area dispensing devices.

Card 8 also includes an expiry date in its memory that is compared with the current date when the card is inserted into terminal 7. If the expiry date has passed, controller 9 will not allow the guest access to the goods. Display 60 will also provide the guest with a message to indicate that they should contact the receptionist to resolve the issue.

The identification data includes information about the preferred language that the guest wishes to use. In turn, controller 9 is responsive to this information for displaying messages on display 60 in the desired language.

The card of this embodiment of the invention also has a security function as follows. If a good is removed from the corresponding formation such that the switch or switches 18 are toggled, the good is deemed to be purchased. Accordingly, even if the

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guest were to return the good to the formation, this would not change the inventory information that is written to card 8. The guest, if they wish, can take the unopened good to reception. At this point, the receptionist takes the good, inserts card 8 into terminal 51 and updates the inventory information appropriately. That is, this function is
5 intended to protect against the dishonest guest who consumes the good and returns the empty package to the formation.

At the end of the guest's visit they proceed to the reception area in the usual manner and check out of the hotel. This process involves inserting card 8 into terminal 51 to determine what, if any, goods were dispensed to the guest during their
10 stay. The list of goods is printed for the user to inspect together with the other charges that were accumulated. Once the amount is agreed upon the bill is settled.

The room service personnel in the hotel are also issued cards with access rights and limits on the number of transactions. However, in this case, the cards are updated with inventory information when goods are allocated to that staff member from the
15 central store of the hotel. That is, the supply manager will have a terminal 51 for validating the card 8 that is provided to the room service personnel. The personnel then proceed from the central store with the goods and card 8.

The relevant personnel then inspect the minibars and dispensing devices that are within their area of responsibility. To replenish the goods within a depleted
20 minibar it is necessary for the staff member to:

1. Insert card 8 into terminal 7 and allow it to be captured within the terminal;
2. Wait for door 5 to open;
3. Place additional goods in minibar 1 which triggers the relevant switches; and
4. Close door 5 and wait for controller 9 to:
- 25 5. Lock the door;
6. Update the inventory information stored on card 8 in accordance with the change in the goods and the unique code for that particular minibar; and
7. Release card 8 from terminal 7.

In this way, the staff member gains an accurate record of the goods that they
30 obtained from the central store and the goods that they deposited in the minibars and dispensing devices for which they are responsible. It will also allow the operator and the staff to identify areas of "slippage" and to remedy these.

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The use of this system allows greater certainty for the guest, the staff and the operator of the hotel. Moreover, it allows the operator to reduce the unit price of the goods as the same revenue can be generated due to the reduced "slippage".

For certain groups of guest, such as those involved with pre-paid tours, the operator has complete discretion to determine whether or not access to the minibar is provided. That is, as these guest do not check in or out in the usual manner there is considerable scope for the slippage referred to above.

The installation of the larger dispensing devices in the common areas is intended to accommodate all guests. In particular, however, these devices are directed toward those who have used all of one particular type of good from the minibar in their room and who wish to have an additional number of those goods.

In some circumstances the operator offers all guests and/or staff free access to the goods for a time limited period and for up to a certain quantum. For example, the operator may wish to reward staff for meeting budgets for a given period and allow them access to the goods for an hour.

Referring to Figures 6 to 15 there is illustrated a second embodiment of the invention. More particularly, a dispensing device, in the form of a minibar 61, includes a prismatic insulated housing 62 for containing one or more goods 63 that are available to be dispensed. Housing 62 includes an opening 64 through which goods 63 are dispensed from the housing. A door 65 is moveable between an open and a closed configuration for respectively allowing and preventing the dispensing of goods 63 through opening 64. Minibar 61 also includes an electromechanical door locking device (not shown) that is similar in function to device 6 of Figure 3. A smart card terminal 67 interacts with a smart card 68 that is associated with a person desiring to access the goods that are within housing 62. Card 68 includes identification data associated with the person. Terminal 67 is responsive to the data for controlling door the locking device and allowing selective dispensing of the goods. An inventory counter, in the form of an electronic controller 69, determines the quantum and type of goods dispensed and adds inventory data to card 68 that is indicative of that quantum and type of goods.

Minibar 61 also includes a card locking device 70 that progresses between a locked and an unlocked configuration for respectively preventing and allowing relative

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movement between card 68 and terminal 67. Moreover, controller 69 prevents actuation of the card locking device unless the door locking device is in the locked configuration.

Minibar 61 is installed in a common area of a hotel or other establishment and is stocked with goods that the guests staying in the hotel, or their visitors, may wish to
5 access. Preferably, the common area is a hallway or passageway that services a number of guest rooms in the hotel. In other embodiments, minibar 61 is installed in or adjacent to entertainment or recreation areas within the hotel. In still further embodiments, the minibar is installed in a guest room of the hotel.

The minibar includes four spaced apart and removable shelves. These shelves
10 are identical in shape and function to shelves 12 as shown in Figures 1, 2 and 3.

As shown in Figures 6 to 11, door 65 includes three separate interconnected panels 91, 92 and 93. Panels 91 and 92 are rearmost and formed from respective punched metal sheets to provide the structural frame of the door. Panel 93 is disposed forward of panel 92 and snap lockingly engaged to both panels 91 and 92 to provide an
15 aesthetically pleasing appearance for the minibar. In this embodiment, panel 93 is formed from injection moulded plastics.

Panel 91 is positioned closest the housing 62 and includes a single elongate aperture 94. Panel 92 includes two apertures 95 and 96 that are separated by a horizontal mounting strip 97, wherein panel 92 is fixedly mounted to panel 91 such that their
20 respective peripheries are aligned with each other and apertures 95 and 96 overlie aperture 94. Additionally, panels 91 and 92 sandwich two spaced apart Perspex windows that span apertures 95 and 96 for allowing a the contents of the minibar to be viewed without having to open door 65.

Terminal 67 and controller 69 are fixedly mounted to strip 97. A two line LCD
25 alpha numeric display 90 is also mounted to strip 97 and positioned adjacent to terminal 67. The display is actuated by controller 69 to provide visual instructions and information to the person wishing to access the goods. In other embodiments different types of displays are used.

Panel 93 includes an aperture 96 aligned with display 90. Panel 93 also includes
30 a recessed portion 98 having a smart card slot 99 for facilitating interaction of card 68 with terminal 67. Panel 93 further includes two spaced apart generally rectangular

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apertures 100 and 101, each corresponding to and overlying respective apertures 95 and 96.

As shown in Figure 10, a card locking device 70 is fixedly connected to mounting strip 97. However, as best shown in Figure 15, device 70 includes the
5 functionality of the card locking device of the earlier described embodiment, and corresponding features are denoted by corresponding reference numerals.

The embodiment of the invention illustrated in Figures 6 to 15 has all the functionality of the embodiment of Figure 1, as well as some additional features. These additional features will be set out below.

10 All the control devices for minibar 61 are contained within door 65. That is, door 65 has a cavity in which the relevant electronic devices are disposed. This allows the invention to be easily applied to an existing refrigerator because, apart from the replacement of the door, there is little structural modification required.

Controller 69 includes sufficient memory to store all transactions that occur
15 over a given time period. In this embodiment, it has been found that a memory capacity for 15,000 transactions is sufficient for most applications. In other embodiments, smaller or greater memory capacity is utilised.

Transactions include not only the removal of goods from minibar 61 (sales transactions) and the replacement of goods from minibar 61 (refill transactions) but also
20 servicing and reprogramming transactions.

While minibar 1 is interlinked by way of smart cards, minibar 61 also provides such communication by way of a serial port (not shown) that is linked with controller 69 and which protrudes from door 65. Use is made of a PDA device (not shown) that is connected to the serial port by way of appropriate cabling to allow a user access to the
25 information contained in the controller memory, as well as the ability to update that information. However, the user's ability to access and update information is regulated by access rights that are pre-assigned to that user. The user is issued with a smart card that contains data indicative of the access rights. This data is provided to controller 69 by inserting the card into the card terminal of minibar 61. In other embodiments, the
30 access rights are retained on the PDA and verification obtained by controller 69 requesting a password.

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The access rights are indicative of the level of authority that is assigned to the individual user. These rights are, in some cases, read only rights, and in other cases, are limited to only some of the minibars in the hotel. For example, for a member of staff who is responsible for refilling ten minibars in a particular area of the hotel, the rights
5 are restricted to those minibars.

The PDA used in this embodiment is a Hewlett Packard Jornada™ device. However, in other embodiments, alternative PDA devices are used.

The use of the PDA device allows the user to more easily update information about the removal or placement of goods within the minibar. Moreover, it has a greater
10 memory capacity than a smart card and allows large quantities of transaction information to be uploaded for transfer to the main computer system of the hotel.

The PDA device also provides a large viewing area for displaying to the user the desired information. This allows a greater level of sophistication in the immediate reporting provided to the user on the various operating parameters of the minibar. It also
15 allows any minor discrepancies in transactions to be diagnosed sooner.

Eventually, the information contained on all the smart cards, in all the memory associated with the controllers 69 and that contained within the PDA devices, is downloaded to the hotel's computer system. There is substantive redundancy built into the information so that auditing and reporting software is able to:

- 20 1. Have access to the data notwithstanding, say, that some of the cards have been lost; and
2. Identify discrepancies in the various sources of transaction data. This allows identification of any areas where remedial action is required.

The software also allows analysis of the transactions to ensure that the available
25 minibar resources are being strategically disposed to ensure maximim guest convenience and staff resources. For example, in some establishments it is possible to establish patterns of usage and, hence, to efficiently apportion staff to refill the minibars and to correctly order new stock, thereby reducing inventories. The establishment of such patterns also allows the hotel operator to more accurately prevent guests being
30 inconvenienced by an empty minibar. Moreover, in additional embodiments, data indicative of the recommended date of consumption for each good is stored in controller 69 or the associated memory. In these embodiments, the hotel operator is able to ensure

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that any goods that are approaching the end of their recommended shelf life are withdrawn from display in a timely manner.

Certain authorised staff are also be given access to adjust the layout and pricing of the stock held within individual minibars. The adjustment is made by:

- 5 1. The staff member inserting a smart card with the required access into the card terminal;
2. Connecting a PDA device to controller 69 via a serial cable; and
3. Entering the updated information via the PDA device.

10 In a similar fashion, a staff member is able to download the current configuration and pricing data from a minibar.

The preferred embodiments of the invention are relatively inexpensive to implement as they do not require wiring to a central control point. Moreover, the use of smart cards works in well with the check in and check out process that is already in place.

15 The preferred embodiment of the invention is retrofittable onto existing minibars and refrigerators. This also allows a reduction in the capital cost required to implement the invention.

20 The invention is also applicable to the dispensing of other goods such as wine and other beverages, whether that is in a bottle shop, hotel, motel, club or other public area. Other applications include dispensing disposable and other equipment in hospitals, for example, drugs and sterilised surgical equipment. The inventory control aspect of the invention is also particularly applicable in the health care arena.

25 The invention is also applicable to industrial environments such as factories for the control and dispensing of inventory such as expensive drill bits, dies and other workpieces.

As all the data from the movement of inventory is tracked from the central store, it is possible to more accurately analyse the flows of the goods and the demand for the various types of goods. This, in turn, will allow better planning of purchasing.

30 It will be appreciated that the system allows the use of master cards for the operator that provide unlimited access to all the dispensing devices and the minibars. This card is used for the purposes of auditing, repair, replacement, stock changes,

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price changes and inspections. Other cards are issued to service personnel to allow routine maintenance and repair.

The card according to the preferred embodiments include security features such as a tamper warning and an expiry date.

- 5 Although the invention has been described with reference to specific examples it will be appreciated by those skilled in the art that it may be embodied in many other forms.

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CLAIMS:-

1. A dispensing device including:
 - a housing for containing one or more goods that are available to be dispensed;
 - an opening in the housing through which the goods are dispensed from the
 - 5 housing;
 - a door that is moveable between an open and a closed configuration for respectively allowing and preventing the dispensing of the goods;
 - a door locking device that progresses between a locked and an unlocked configuration for respectively retaining the door in the closed configuration and
 - 10 allowing the door to be moved to the open configuration;
 - a card terminal for interacting with a card associated with a person desiring to access the goods within the housing, the card including identification data associated with the person and the terminal being responsive to the data for controlling the locking device and allowing selective dispensing of the goods; and
 - 15 an inventory counter for determining the quantum and type of goods dispensed and for adding inventory data to the card indicative of that quantum and type of goods dispensed.
2. A device according to claim 1 including a card locking device that progresses between a locked and an unlocked configuration for respectively preventing and
- 20 allowing relative movement between the card and the terminal.
3. A device according to claim 2 including a lock controller that is responsive to the identification data for selectively allowing operation of the locking devices and the dispensing of the goods to the person.
4. A device according to claim 3 wherein the controller prevents actuation of the
- 25 card locking device unless the door locking device is in the locked configuration.
5. A dispensing device including:
 - a housing for containing one or more goods that are available to be dispensed;
 - an opening in the housing through which the goods are dispensed from the
 - housing;
 - 30 a door for moving between an open and a closed configuration for respectively allowing and preventing the dispensing of the goods through the opening;

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a door locking device that progresses between a locked and an unlocked configuration for respectively retaining the door in the closed configuration and allowing the door to be moved to the open configuration;

5 a card terminal for interacting with a card associated with a person desiring to access the goods within the housing, the card including identification data associated with the person;

a card locking device that progresses between a locked and an unlocked configuration for respectively preventing and allowing relative movement between the card and the terminal; and

10 a lock controller being responsive to the data for selectively allowing operation of the locking devices and the dispensing of the goods to the person, the controller also preventing actuation of the card locking device unless the door locking device is in the locked configuration.

6. A device according to claim 5 including an inventory counter for determining
15 the quantum and type of goods dispensed and for adding inventory data to the card that is indicative of that quantum and type of goods dispensed.

7. An inventory recording system including:

a validation terminal for issuing a card to a person, wherein the card contains identification data for the person;

20 a plurality of dispensing devices containing goods that are available to be dispensed, the devices each having a card terminal for interacting with the card for allowing selective dispensing of the goods to the person wherein, upon that dispensing occurring, the card terminal adds inventory data to the card that is indicative of the quantum and type of goods dispensed; and

25 a control terminal for interacting with the card to access the inventory information for providing a record of the goods that were dispensed.

8. An inventory control system including:

a validation terminal for issuing a card to a person, wherein the card contains identification data for the person;

30 a store terminal that adds store data to the card that is indicative of the type and quantity of goods that have been allocated to the person;

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a plurality of dispensing devices for containing goods that are available to be dispensed, the devices each having a card terminal for interacting with the card for allowing selective access to the dispensing device wherein, once that access has occurred, the card terminal adds inventory data to the card that is indicative of the
5 quantum and type of goods dispensed and the quantum and type of goods added to the dispensing device; and

a control terminal for interacting with the card to access the inventory information for providing a record of the goods that were dispensed and the goods that were added.

10 9. A system according to claim 8 wherein the validation terminal validates the card for use with only selected ones of the plurality of dispensing devices.

10. A dispensing device including:

a housing for containing one or more goods that are available to be dispensed;

an opening in the housing through which the goods are dispensed from the

15 housing;

a door that is moveable between an open and a closed configuration for respectively allowing and preventing the dispensing of the goods;

a shelf located within the housing for supporting the goods;

a detector for determining the presence or absence of the goods on the shelf; and

20 a card terminal for interacting with a card associated with a person desiring to access the goods within the housing, the card including identification data associated with the person and the terminal being responsive to the detector for adding inventory data to the card indicative of the quantum and type of goods dispensed.

11. A device according to claim 10 including a door locking device that progresses
25 between a locked and an unlocked configuration for respectively retaining the door in the closed configuration and allowing the door to be moved to the open configuration.

12. A device according to claim 11 wherein the terminal is responsive to the identification information for selectively actuating the locking device to progress between the locked and the unlocked configurations.

30 13. A device according to claim 12 including a card locking device that progresses between a locked and an unlocked configuration for respectively preventing and allowing relative movement between the card and the terminal.

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14. A device according to claim 13 including a lock controller that is responsive to the identification data for selectively allowing operation of the locking devices and the dispensing of the goods to the person.

15. A device according to claim 14 wherein the controller prevents actuation of the card locking device unless the door locking device is in the locked configuration.

16. A device according to claim 15 wherein the shelf includes an array of formations for receiving complementarily shaped goods.

17. A device according to claim 16 wherein the detector includes a plurality of switches that are located adjacent respective formations.

18. A device according to claim 17 wherein the formations include respective bases and the switches are located at or below the base, wherein the switches are triggered by the weight of the respective good.

19. A shelf for a dispensing device, the shelf including:

a platform for supporting goods;

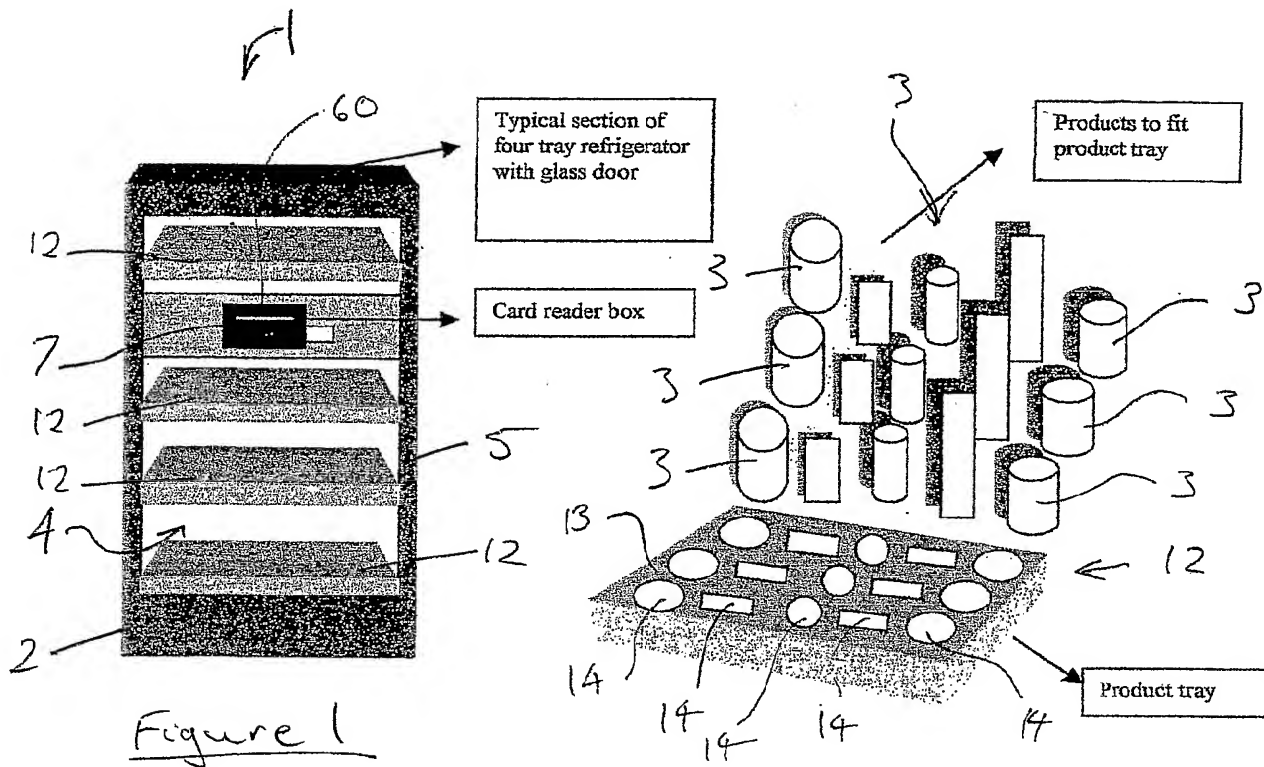
an array of locating formations in the platform for receiving the respective goods; and

a plurality of detectors associated with the respective formations for providing signals indicative of the movement of the goods into or out of engagement with the formations.

20. A shelf according to claim 19 including a controller that is responsive to the signals for providing inventory data that is indicative of the quantity and type of goods that are supported on the shelf.

21. A device according to claim 20 wherein the inventory data is also indicative of changes in the goods that are supported by the shelf.

25



Smartbar Corridor Model sixty product unit

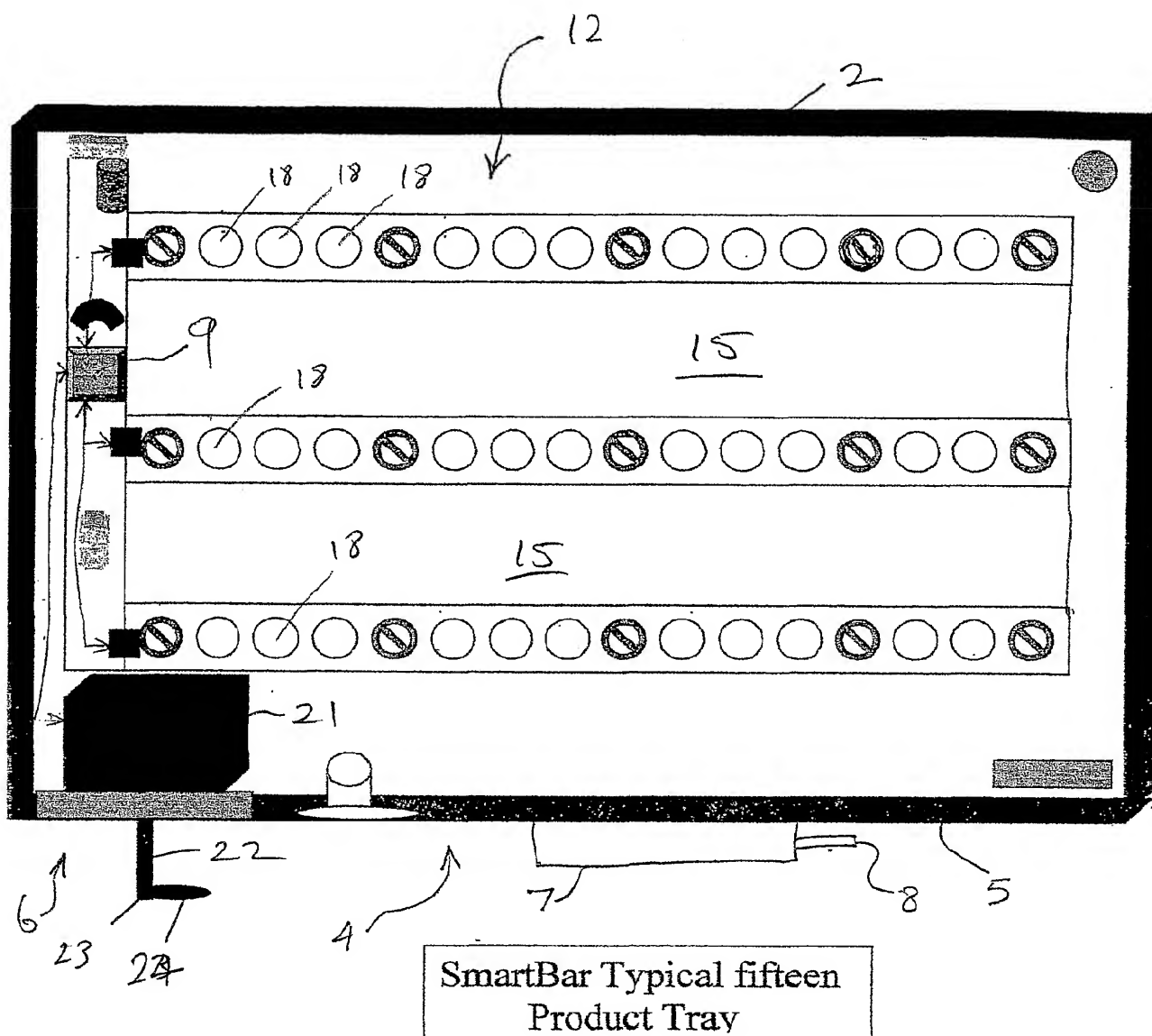


Figure 3

Figure 4

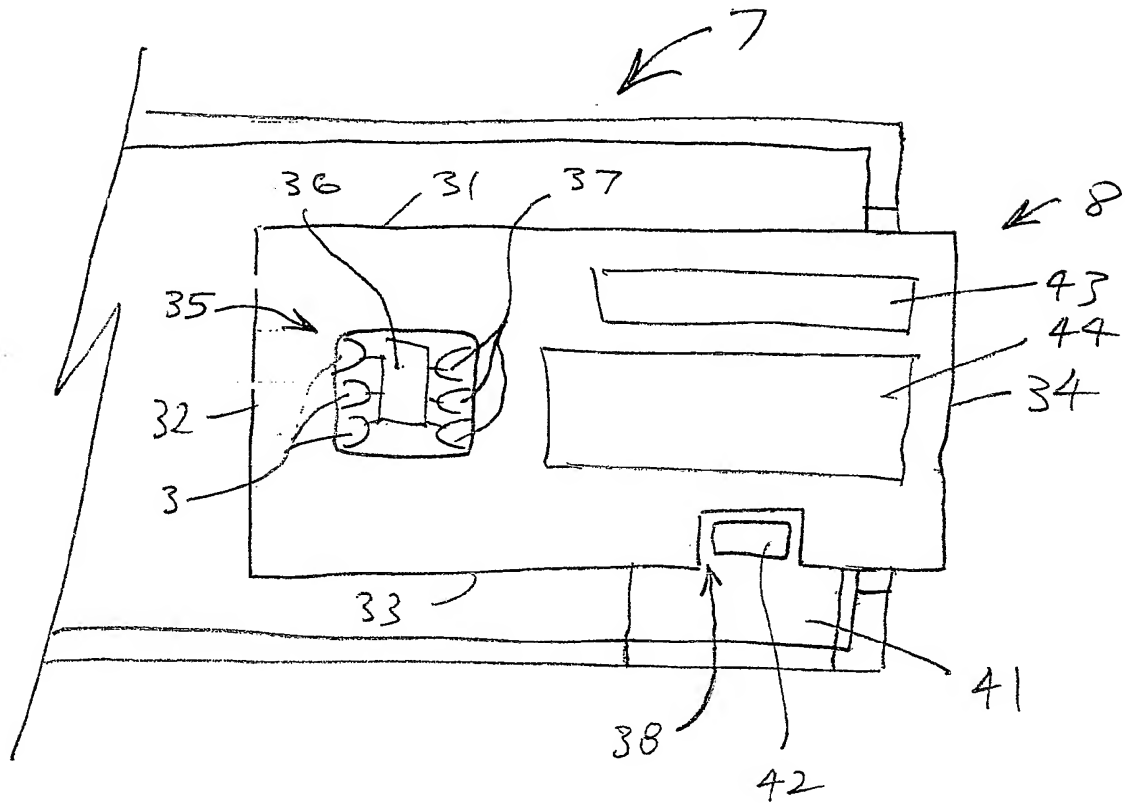
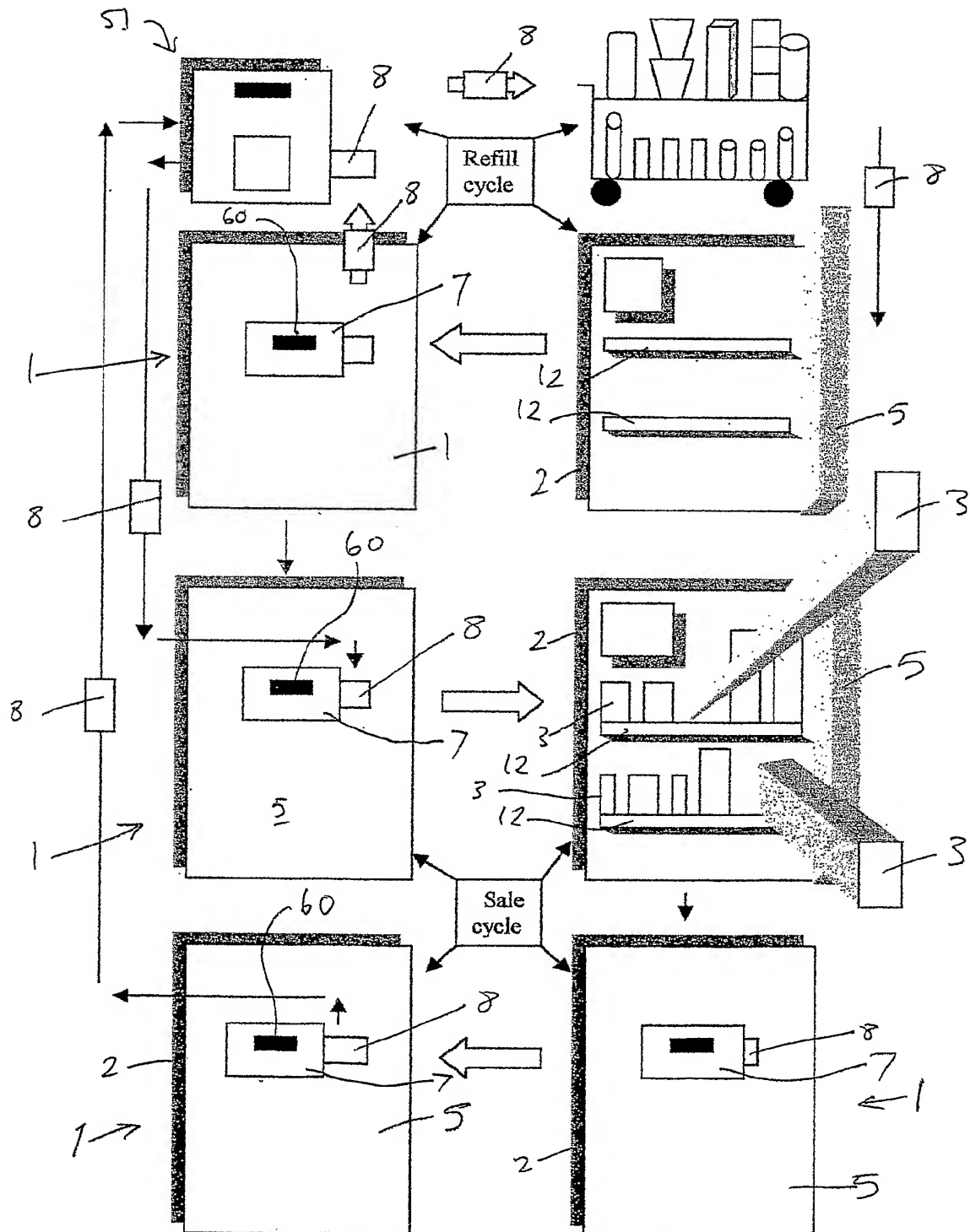


Figure 5

SmartBar Operating System



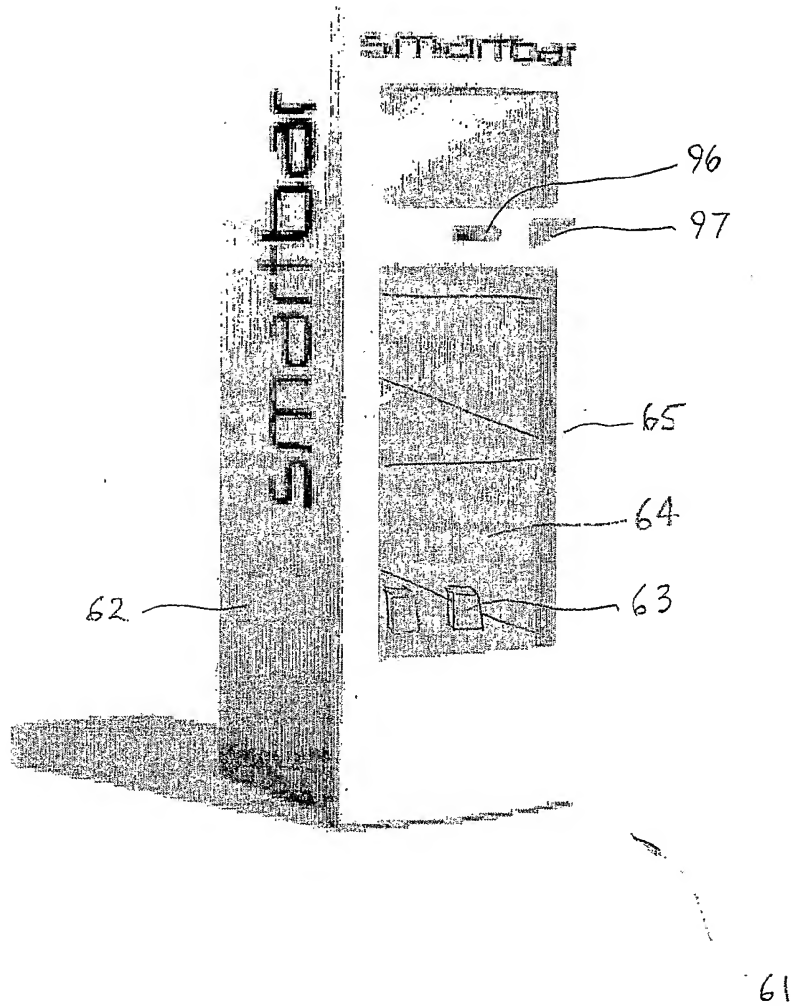


FIG. 6

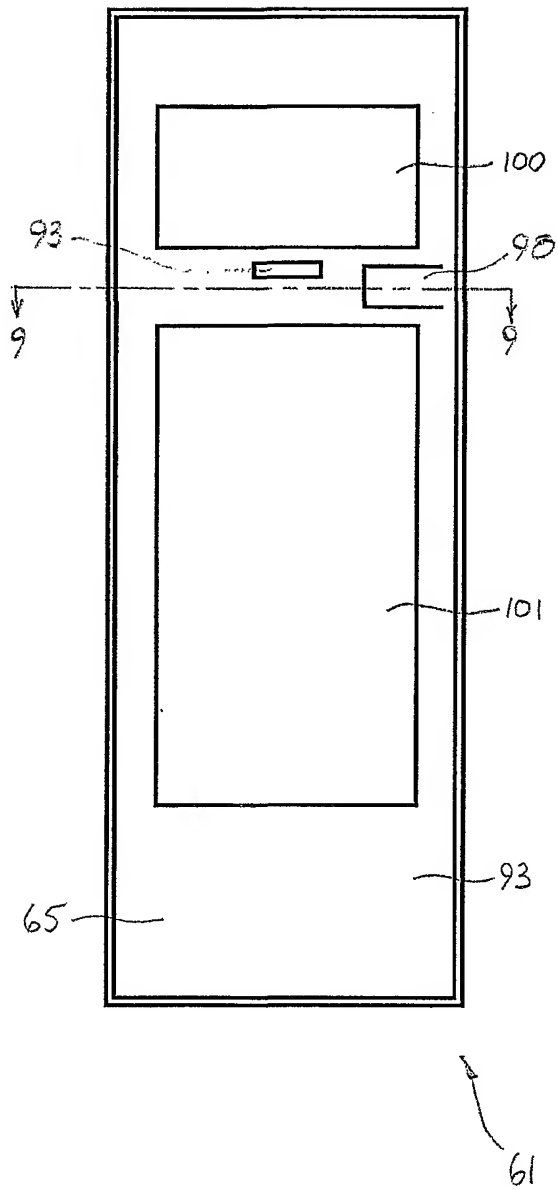


FIG. 7



FIG. 8

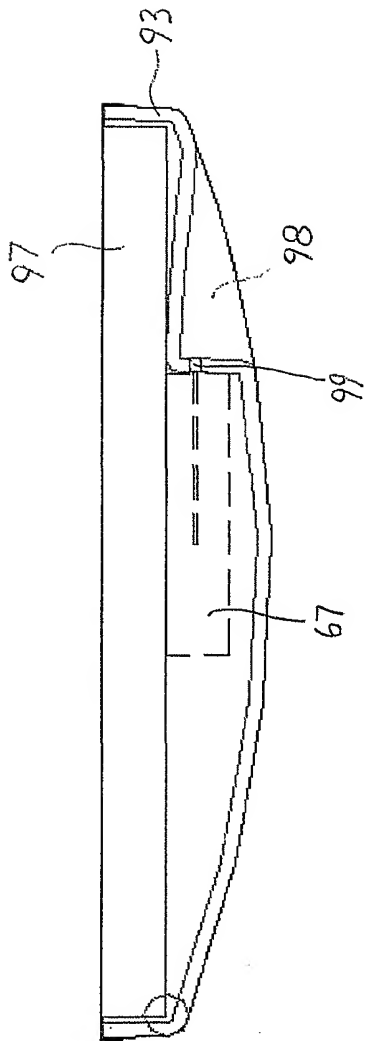


FIG. 9

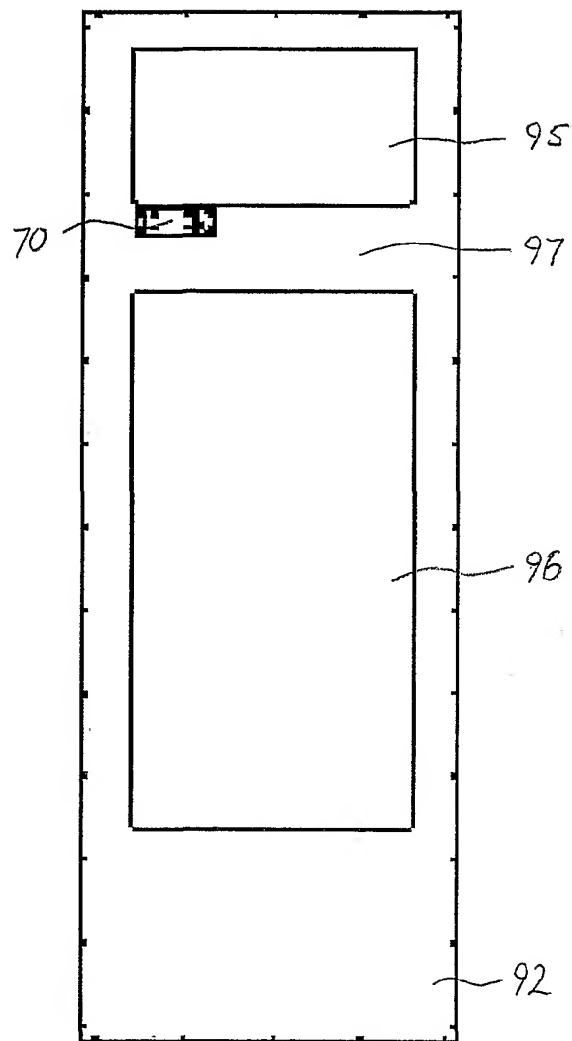


FIG. 10

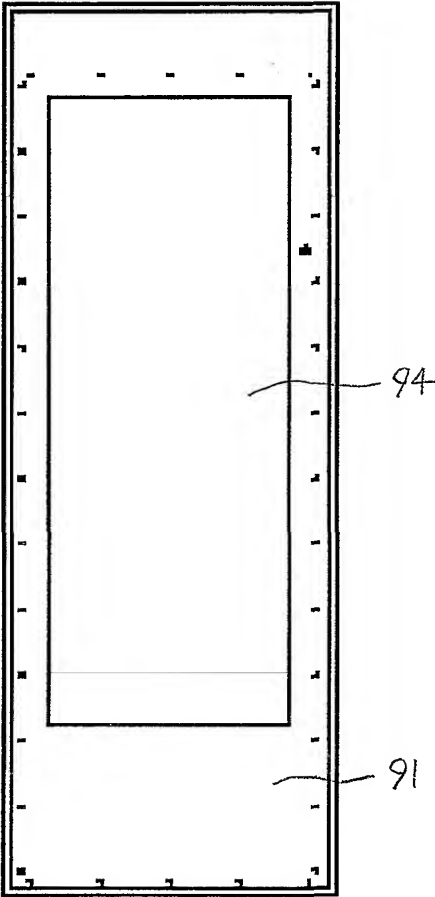


FIG. 11

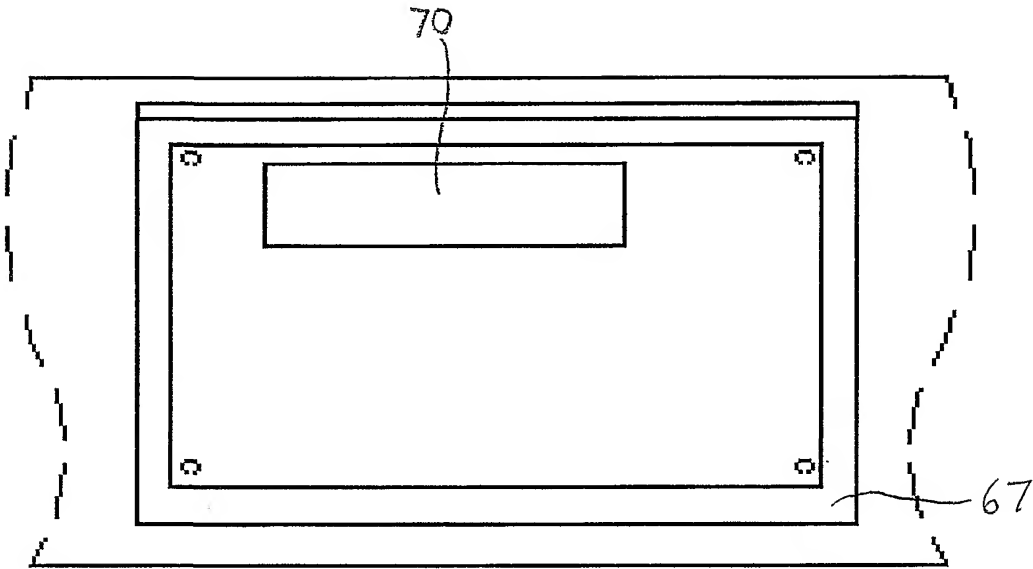


FIG. 12

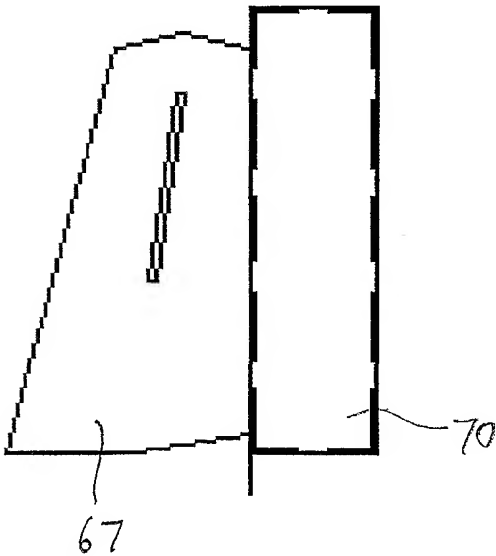


FIG. 13

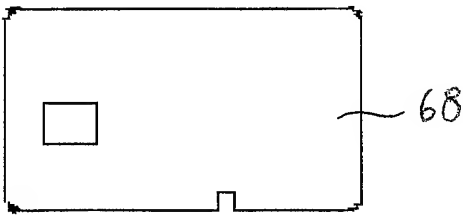


FIG. 14

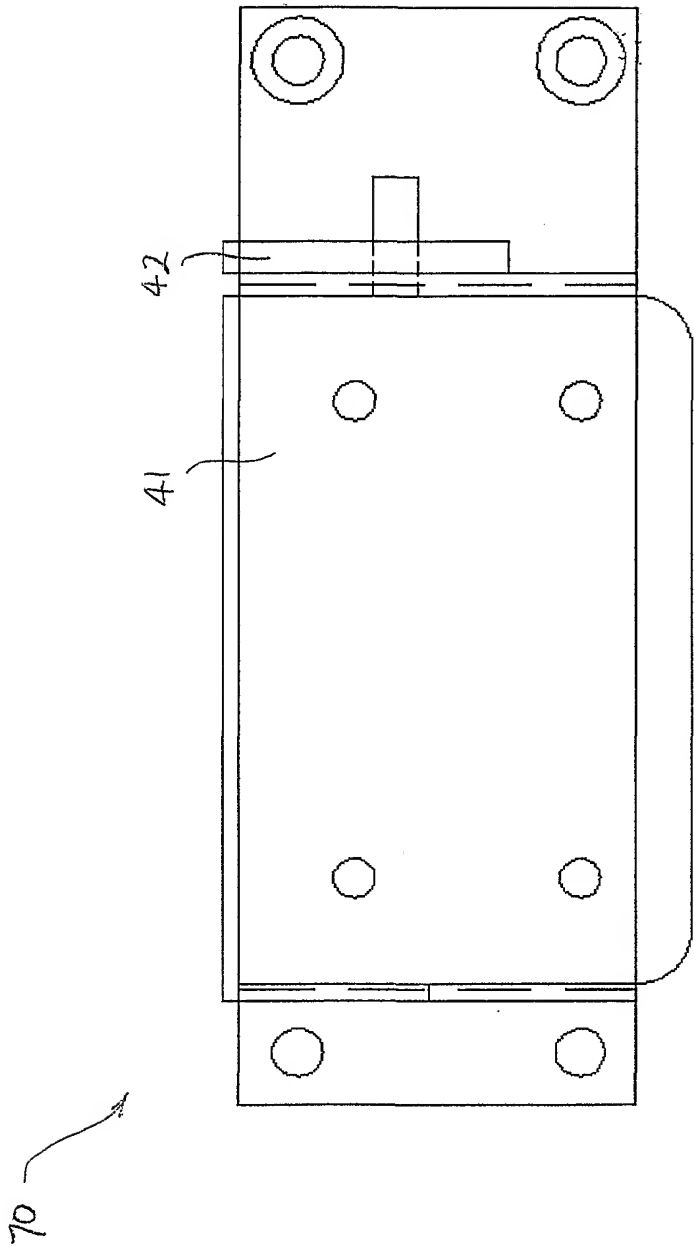


FIG. 15

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU02/00025

A. CLASSIFICATION OF SUBJECT MATTER														
Int. Cl. ⁷ : G07F 7/08 G06F 17/60 // 151:00 17/60 // 153:00 F25D 23/00 23/02 25/02														
According to International Patent Classification (IPC) or to both national classification and IPC														
B. FIELDS SEARCHED														
Minimum documentation searched (classification system followed by classification symbols)														
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched														
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT. Keywords - dispensing, vending, card, identification, detect, shelf and similar terms														
C. DOCUMENTS CONSIDERED TO BE RELEVANT														
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.												
X	WO 96/31833 A (COWE) 10 October 1996 Abstract; Fig. 5; page 32, lines 9-31; page 54, line 35 - page 55, line 12	1-21												
X	WO 97/28509 A (XESTAL, S.L) 7 August 1997 Abstract	1-21												
X	US 5819981 A (COX) 13 October 1998 Column 2, line 54 - column 3, line 15	1-21												
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex														
<table border="0"> <tr> <td>* Special categories of cited documents:</td> <td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td></td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family	"O" document referring to an oral disclosure, use, exhibition or other means		"P" document published prior to the international filing date but later than the priority date claimed	
* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention													
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone													
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art													
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family													
"O" document referring to an oral disclosure, use, exhibition or other means														
"P" document published prior to the international filing date but later than the priority date claimed														
Date of the actual completion of the international search 19 March 2002		Date of mailing of the international search report 15 APR 2002												
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929		Authorized officer ROSEMARY LONGSTAFF Telephone No : (02) 6283 2637												

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU02/00025

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99/35322 A (FIELD et al.) 15 July 1999 Page 3, lines 4-21; claim 21	1-9
X	Derwent Abstract Accession Number 88-085921, EP 261618 A (MICROTRONIC AG) 30 March 1988 Abstract	5
X	GB 2307560 A (MINIBAR PRODUCTION LTD) 28 May 1997 Abstract	19-21
X	WO 97/14104 A (OMNICELL TECHNOLOGIES, INC.) 17 April 1997 Abstract; Page 5, lines 6-19	19-21
X	US 4866661 A (DE PRINS) 12 September 1989 Figs 17-21; column 36, line 43 - column 37, line 39	19-21
X	WO 00/01281 A (THE COCA-COLA CO.) 13 January 2000 Page 7, lines 10-12	19-21

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU02/00025

Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos :
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos :
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-18 relate to a dispensing device characterised by a card terminal for interacting with a card associated with a person desiring to access the goods, the card including ID data associated with the person.
 2. Claims 19-21 related to a shelf for a dispensing device, including an array of formations for receiving goods and a plurality of detectors associated with the formations for detecting the movement of the goods.
1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
 2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU02/00025

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
WO	9631833	EP	819277	US	5671362		
WO	9728509	NONE					
US	5819981	NONE					
WO	9935322	AU	18645/99				
EP	261618	CH	671840				
GB	2307560	NONE					
WO	9714104	AU	38140/95	CA	2239546	EP	954800
US	4866661	AU	70658/87	BR	8701341	CA	1281816
		EP	239110	JP	62271094	JP	2077897
		NO	871244				
WO	200001281	AU	49724/99	US	6073460		
END OF ANNEX							